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WHAT HAPPENS TO NONMERCHANTABLE TREES LEFT AFTER CLEARCUTTING?

by
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Clearcutting is the principal method of harvesting pulp timber in southeast Alaska. There are three long-term pulp timber sales in progress at the present time in this region. Contracts for these sales specify and require only merchantable trees to be cut. 1/ The trees left standing after cutting are usually referred to as "residual trees."

The number of residual trees left after clearcutting depends primarily on the yarding methods used. A 10-acre tractor-yarded area on the Maybeso Experimental Forest, Prince of Wales Island, had 95 residual trees over 5.0 inches d.b.h. These residual trees averaged 9.5 inches d.b.h. and 42 feet tall. Though no census of a high-lead-yarded area has been made, there are noticeably fewer residual trees present on such areas.

1/ Merchantability specifications differ for each of the three pulp sales. The sale contract involving this study area defines a merchantable tree as "Any live tree which...contains one or more logs not less than 20 feet long, at least 10 inches in diameter inside the bark at the small end and after deductions for visible indications for defect contains a net scale of at least 50 percent of the gross scale and having a net total merchantable volume of 25 percent or more of the total volume of the tree, ..."

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Are these residual trees detrimental or beneficial? To answer this question we studied for five years the survival, growth, and cone production of 100 residual trees on a high-lead-yarded area on the Maybeso Experimental Forest. Eighty-eight trees were western hemlock (Tsuga heterophylla (Raf.) Sarg.) and 12 were Sitka spruce (Picea sitchensis (Bong.) Carr.). Their condition, immediately after logging in 1957, was variable. Fifty-five had basal or bole scars; 30 had broken tops; 13 were leaning, crooked, obviously diseased, or otherwise inferior. Twenty-three showed no serious injury or defect.

Tree mortality.--Forty-nine hemlock and two spruce survived the 5-year period following logging. Of the 49 trees lost, 33 blew down, 14 died from logging damage, and two died of insect or disease damage.

Cone production.--Cone production on the surviving trees is shown in table 1. No tests of seed quality or quantity were made.

Table 1.--Cone production of residual trees, 1958-1962

Year	Surviving trees	Trees producing crops of--		
		1-50 cones	51-250 cones	More than 250 cones
	(number)	(percent)	(percent)	(percent)
1958	77	6	0	1
1959	67	6	7	12
1960	56	2	0	0
1961	53	2	0	0
1962	51	22	16	0

Growth.--Five-year diameter growth at breast height, inside bark, of the surviving trees averaged 1.08 inches as compared to 0.36 inches for the 5-year period before logging. Release growth was evident the first growing season after logging. Forty-six of the 51 surviving trees had no damage to the terminal shoot. Average 5-year height growth on these undamaged trees was 1.1 foot.

Live crown length was reduced from 75 percent of total tree height to 50 percent during the study period. Crown area increased from 50 percent at the time of logging to 75 percent five years later. In other words, crowns filled in and the lower branches died.

Conclusions.--This study of residual trees indicated a 5-year survival rate of 51 percent. Wind and logging damage caused greatest mortality. Response of diameter growth to release was good but height growth response was poor. The trees produced cones but the quality and quantity of the seed was not determined.

It seems unlikely that residual trees such as those reported upon will form a significant part of a new stand or be detrimental to its establishment. They may, in some cases, serve as a supplementary seed source on cut-over areas. The genetic quality of this seed is not known, but so far we have no reason to suspect that seed produced by these trees is genetically inferior. Thus, there appears to be no silvicultural reason for eliminating residual trees in this and comparable situations.

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